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EXAMINER	
AMARI, ALESSANDRO V	
ART UNIT	**PAPER NUMBER**
2872	

DATE MAILED: 02/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/823,841	POCIUS ET AL.	
	Examiner	Art Unit	
	Alessandro V. Amari	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-52* is/are pending in the application.

4a) Of the above claim(s) *6,14-22,25,26,35-40,48 and 49* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-5,7-13,23,24,27-34,41-47 and 50-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli US Patent 5,317,170 in view of Duveneck et al US Patent 6,469,785.

In regard to claim 5, Paoli teaches (see Figure 1B, 4, 7, 8) a method of forming a light emitting device, said method comprising forming at least one of Fresnel lens (178) and holographic diffuser on at least one surface of a semiconductor light emitter (30) as described in column 2, lines 67-68 and column 3, lines 1-30 and column 12, lines 25-48.

However, Paoli does not teach that said forming comprises at least one method selected from ablation, machining, scribing and electron discharge machining.

In regard to claim 5, Duveneck does teach that said forming comprises at least one method selected from ablation, machining, scribing and electron discharge machining as described in column 7, lines 44-50.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the lens by the methods of Duveneck for the device of Paoli since scribing as taught by Duveneck is recognized in the art as a common and efficient means for producing the structures of a Fresnel lens.

3. Claims 2, 3, 7, 8, 9, 10, 11, 27, 28, 29, 30 rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli US Patent 5,317,170 in view of Duveneck et al US Patent 6,469,785 and further in view of Calveley US Patent 6,165,911.

In regard to claims 3 and 27, Paoli teaches (see Figure 1B, 4, 7, 8) a method of forming a light emitting device, said method comprising forming at least one of Fresnel lens (178) and holographic diffuser (86 in Figure 4) on at least one surface of a semiconductor light emitter (30) as described in column 2, lines 67-68 and column 3, lines 1-30 and column 12, lines 25-48.

Regarding claim 2, Paoli discloses (see Figure 7) that said semiconductor light emitter has at least one light extraction surface (182) from where light is intended to be extracted, and wherein said forming is done on at least one extraction surface of said semiconductor light emitter as described in column 12, lines 25-38.

Regarding claim 7, Paoli discloses that said method further comprises confining light emission to a preselected section of said light emitting layer as described in column 5, lines 60-68.

Regarding claim 8, Paoli discloses that said confining comprises at least one method selected from applying the Holonyak process, using selective area growth, using selective area bonding, using diffusion and using ion implantation as described in column 5, lines 17-24.

Regarding claims 9 and 28, Paoli discloses coating one or more surfaces of said semiconductor light emitter with a reflective material as described in column 9, lines 23-26.

Regarding claim 10, Paoli discloses coating said holographic diffuser with a reflective material as described in column 10, lines 43-49.

Regarding claim 11, Paoli discloses forming an optical element on the surface opposite of said extraction surface as described in column 12, lines 25-48.

Regarding claim 30, Paoli teaches that said semiconductor layer comprises a transparent aluminum-bearing compound as described in column 4, lines 21-35.

However, in regard to claims 3, 27 and 29, Paoli is silent as to the manner in which the lens is made.

In regard to claims 3, 27 and 29, Duveneck discloses a common method for manufacturing a Fresnel lens using a stamping block as described in column 7, lines 44-50 and column 14, lines 5-11.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the lens by the methods of Duveneck for the device of Paoli since stamp forming as taught by Duveneck is recognized in the art as a common and efficient means for producing the structures of a Fresnel lens.

However, in regard to claims 3 and 27, neither Paoli or Duveneck teach that the stamping block comprises a material selected from the group of molybdenum, titanium, zirconium, graphite, silicon carbide, sapphire, stainless steel, tungsten, tantulum, columbium and alloys thereof.

In regard to claims 3 and 27, Calveley does teach that the stamping block comprises a material selected from the group of molybdenum, titanium, zirconium,

graphite, silicon carbide, sapphire, stainless steel, tungsten, tantulum, columbium and alloys thereof as described in column 7, lines 39-45.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to stamp the lens of Paoli in view of Duveneck using a stamping block with the material as taught by Calveley since stamping blocks made of this material exhibit very high durability thus increasing the precision of the formed structures over the operational life of the stamping block.

4. Claims 3, 10 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanagase et al US Patent 5,528,057 in view of Calveley US Patent 6,165,911.

In regard to claims 3 and 27, Yanagase et al teaches (see Figures 1-4) a method of forming a light emitting device, said method comprising forming at least one of Fresnel lens (8) and holographic diffuser on at least one surface of a semiconductor light emitter (14) wherein said forming comprises pressing a stamping block against at lest one surface of said semiconductor light emitter as described in column 4, lines 26-34. Regarding claim 10, Yanagase teaches coating said Fresnel lens with a reflective material as described in column 4, lines 36-38.

However, in regard to claims 3 and 27, Yanagase et al does not teach that the stamping block comprises a material selected from the group of molybdenum, titanium, zirconium, graphite, silicon carbide, sapphire, stainless steel, tungsten, tantulum, columbium and alloys thereof.

In regard to claims 3 and 27, Calveley does teach that the stamping block comprises a material selected from the group of molybdenum, titanium, zirconium,

graphite, silicon carbide, sapphire, stainless steel, tungsten, tantulum, columbium and alloys thereof as described in column 7, lines 39-45.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to stamp the lens of Yanagase et al in view of Calveley using a stamping block with the material as taught by Calveley since stamping blocks made of this material exhibit very high durability thus increasing the precision of the formed structures over the operational life of the stamping block.

5. Claims 12, 13, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanagase et al US Patent 5,528,057 in view of Jiang et al US Patent 5,966,399.

In regard to claim 12, Yanagase et al teaches (see Figures 1-4) a light emitting device comprising a semiconductor light emitter (14) and a first optical element (8) stamped on at least one surface of said semiconductor light emitter comprising one of a Fresnel lens and a holographic diffuser as described in column 4, lines 26-34 and as shown in Figures 1-4. Regarding claim 13, Yanagase et al further teaches a reflective material coating at least one surface of the device as described in column 4, lines 36-38. Regarding claims 23 and 24, Yanagase et al teaches that said first optical element is designed to achieve one of light focusing, collimating and diverging or to direct light in a preselected direction as described in column 3, lines 63-67 and column 4, lines 1-10 and as shown in Figure 2.

However, in regard to claim 12, Yanagase et al does not teach that the stamped surface is one of an alloy comprising $(Al_xGa_{1-x})_y In_{1-y}P$ where $0 <= x <= 1$ and $0 <= y <= 1$ and a III-nitride alloy.

In regard to claim 12, Jiang et al does teach that the stamped surface is one of an alloy comprising $(Al_xGa_{1-x})_y In_{1-y}P$ where $0 <= x <= 1$ and $0 <= y <= 1$ and a III-nitride alloy as described in column 2, lines 33-39 and column 7, lines 20-29.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a lens with a material as taught by Jiang et al in the device of Yanagase et al in order to produce a thinner and stronger lens and therefore to produce a more compact device.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli U.S. Patent 5,317,170 in view of Duveneck et al US Patent 6,469,785 and further in view of Kish et al U.S. Patent 5,376,580.

Regarding claim 4, Paoli in view of Duveneck et al teaches the invention as set forth above but does not teach that said forming is executed concurrently with a wafer-bonding process, said wafer bonding process comprising removing a first substrate of said semiconductor light emitter and bonding a second substrate to said semiconductor light emitter.

Regarding claim 4, Kish et al does teach said forming is executed concurrently with a wafer-bonding process, said wafer bonding process comprising removing a first substrate of said semiconductor light emitter and bonding a second substrate to said

semiconductor light emitter as described in column 3, lines 28-48, column 6, lines 36-68 and column 7, lines 23.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the wafer bonding process as taught by Kish et al in the light emitting device of Paoli in view of Duveneck in order to increase mechanical and/or thermal stability of the light emitting device.

7. Claims 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli U.S. Patent 5,317,170 in view of Duveneck et al US Patent 6,469,785 and further in view of Calveley US Patent 6,165,911 and further in view of Fogarty U.S. Patent 5,141,677.

Regarding claims 31-33, Paoli in view of Duveneck and further in view of Calveley teaches the invention as set forth above but does not teach that said stamping is executed at an elevated temperature, said elevated temperature being higher than room temperature or lowering said elevated temperature to facilitate the separation of a stamping block from said semiconductor light emitter after said stamping or that said elevated temperature is higher than the ductile transition temperature of the material constituting said at least one surface on which the optical element is formed.

Regarding claims 31-33, Fogarty teaches that said stamping is executed at an elevated temperature, said elevated temperature being higher than room temperature as described in column 9, lines 19-25 or lowering said elevated temperature to facilitate the separation of a stamping block from the light emitter after said stamping as described in column 9, lines 41-45 or that said elevated temperature is higher than the

ductile transition temperature of the material constituting said at least one surface on which the optical element is formed as described in column 8, lines 17-24.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the stamping temperatures and processes as taught by Fogarty in the light emitting device of Paoli and Duveneck and Calveley in order to increase the ease of separation between the block and the optical element due to thermal expansion and contraction properties of the block material.

8. Claims 34, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli US Patent 5,317,170 in view of Duveneck et al US Patent 6,469,785 and further in view of Jiang et al US Patent 5,966,399.

In regard to claims 34, 41 and 42, Paoli teaches (see Figures 1B, 7, 8) a light emitting device comprising a semiconductor light emitter (30); and at least one optical element being one of a Fresnel lens and a holographic diffuser on at least one surface of said semiconductor light emitter, wherein said optical element is a first optical element (178) as described in column 2, lines 67-68 and column 3, lines 1-30 and column 12, lines 25-48.

However, in regard to claims 34, 41 and 42, Paoli does not teach that said forming comprises stamping the optical element against a surface of the semiconductor light emitter.

In regard to claims 34, 41 and 42, Duveneck et al does teach that said forming said optical element comprises stamping against at least one surface of the

semiconductor light emitter as described in column 7, lines 44-50 and column 14, lines 5-11.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the lens by the methods of Duveneck for the device of Paoli since stamp forming as taught by Duveneck is recognized in the art as a common and efficient means for producing the structures of a Fresnel lens.

However, the combination of Paoli in view of Duveneck et al does not further teach that the stamped surface is one of an alloy comprising $(Al_xGa_{1-x})_y In_{1-y}P$ where $0 <= x <= 1$ and $0 <= y <= 1$ and a III-nitride alloy.

In regard to claim 12, Jiang et al does teach that the stamped surface is one of an alloy comprising $(Al_xGa_{1-x})_y In_{1-y}P$ where $0 <= x <= 1$ and $0 <= y <= 1$ and a III-nitride alloy as described in column 2, lines 33-39 and column 7, lines 20-29.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a lens with a material as taught by Jiang et al in the combination of Paoli in view of Duveneck et al in order to produce a thinner and stronger lens and therefore to produce a more compact device.

9. Claims 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli U.S. Patent 5,317,170 in view of Duveneck et al US Patent 6,469,785 in view of Jiang et al US Patent 5,966,399 and in further view of Tomomura et al. U.S. Patent 4,988,579.

In regard to claims 43 and 44, Paoli teaches (see Figure 1A, 7, 8) a display device comprising a light emitting device which comprises: a semiconductor light emitter

(30); and one of a optical element (178) formed on a surface of said semiconductor light emitter as described in column 2, lines 67-68 and column 3, lines 1-30 and column 12, lines 25-48.

However, Paoli does not teach an optical element stamped on a surface of said semiconductor light emitter.

In regard to claims 43 and 44, Duveneck et al does teach that said forming said optical element comprises stamping against at least one surface of the semiconductor light emitter as described in column 7, lines 44-50 and column 14, lines 5-11.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the lens by the methods of Duveneck for the device of Paoli since stamp forming as taught by Duveneck is recognized in the art as a common and efficient means for producing the structures of a Fresnel lens.

However, the combination of Paoli in view of Duveneck et al does not further teach that the stamped surface is one of an alloy comprising $(Al_xGa_{1-x})_y In_{1-y}P$ where $0 <= x <= 1$ and $0 <= y <= 1$ and a III-nitride alloy.

In regard to claims 43 and 44, Jiang et al does teach that the stamped surface is one of an alloy comprising $(Al_xGa_{1-x})_y In_{1-y}P$ where $0 <= x <= 1$ and $0 <= y <= 1$ and a III-nitride alloy as described in column 2, lines 33-39 and column 7, lines 20-29.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a lens with a material as taught by Jiang et al in the combination of Paoli in view of Duveneck et al in order to produce a thinner and stronger lens and therefore to produce a more compact device.

Furthermore, Paoli in view of Duveneck et al and further in view of Jiang et al does not teach a display device comprising at least one blue light emitting device, at least one green light emitting device, and at least one red light emitting device.

In regard to claims 43 and 44, Tomomura et al. does teach (see Figures 11 and 12) a display device comprising at least one blue light emitting device, at least one green light emitting device, and at least one red light emitting device, wherein at least one of said blue light emitting device, green light emitting device, and red light emitting device as described in column 7, lines 36-68 and column 8, lines 1-3.

It would have been obvious to one having ordinary skill in the art at the time the invention was made utilize the red, green and blue light emitting devices as taught by Tomomura et al. in the combination of Paoli in view of Duveneck et al and further in view of Jiang et al in order to produce light with high efficiency and brightness over a large spectral range.

10. Claims 45, 46, 51 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duveneck et al US Patent 6,469,785 in view of Spaeth et al US Patent 5,875,205.

In regard to claims 45 and 52, Duveneck et al teaches (see Figure 5) a light emitting device or a method for forming a light emitting device or semiconductor light emitter, said method comprising, forming an optical element (346, 348) in a material, and bonding said material to a semiconductor light emitter as described in column 13, lines 21-39 and column 14, lines 5-11.

Regarding claim 46, Duveneck teaches that said stamping precedes said bonding as described in column 13, lines 21-39 and column 14, lines 5-11.

However, in regard to claims 45 and 52, Duveneck et al does not teach that said material being transparent to light emitted from said light emitting device, said material being one of high index optical glass, III-V semiconductors, II-VI semiconductors, group IV semiconductors, high-index organic semiconductors, high index organic compounds, and mixtures and alloys thereof. Regarding claim 50, Duveneck et al does not teach bonding said material to a semiconductor light emitter with a bonding material, said bonding material being one of high index optical glass, III-V semiconductors, II-VI semiconductors, group IV semiconductors, high index organic semiconductors, high index organic compounds, and mixtures or alloys thereof.

In regard to claims 45 and 52, Spaeth et al does teach that said material being transparent to light emitted from said light emitting device, said material being one of high index optical glass, III-V semiconductors, II-VI semiconductors, group IV semiconductors, high-index organic semiconductors, high index organic compounds, and mixtures and alloys thereof as described in column 2, lines 45-64 and column 4, lines 38-52.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the optical materials as taught by Spaeth et al in the device of Duveneck et al in order to improve the coupling efficiency between the lens and the light emitter.

Regarding claim 51, the combination teaches the invention as set forth above, but does not teach that bonding comprises pressing said material together with said semiconductor light emitter at a temperature greater than room temperature.

Official notice is taken that it is notoriously old and well known in the semiconductor art to bond material together at a temperature greater than room temperature. It would have been obvious to one of ordinary skill in the art at the time the invention was made to bond material together at a temperature greater than room temperature in order to achieve proper adhesion.

11. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Duveneck et al US Patent 6,469,785 in view of Spaeth et al US Patent 5,875,205.

Regarding claim 47, the combination teaches the invention as set forth above and that said stamping precedes said bonding but does not teach the reverse, i.e., said bonding precedes said stamping. It would have been obvious to one having ordinary skill in the art at the time the invention was made to reverse the process wherein bonding precedes stamping, since it has been held that a mere reversal of working parts of a device involves only routine skill in the art. One would have been motivated to reverse the process for the purpose of securing proper attachment of the material to the semiconductor light emitter.

12. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Duveneck et al US Patent 6,469,785 in view of Spaeth et al US Patent 5,875,205 and further in view of Gaudiana et al US Patent 5,132,430.

Regarding claim 50, Duveneck et al in view of Spaeth et al teaches the invention as set forth above but does not teach bonding said material to a semiconductor light emitter with a bonding material, said bonding material being one of high index optical glass, III-V semiconductors, II-VI semiconductors, group IV semiconductors, high index organic semiconductors, high index organic compounds, and mixtures or alloys thereof.

Gaudiana et al does teach bonding said material to a semiconductor light emitter with a bonding material, said bonding material being one of high index optical glass, III-V semiconductors, II-VI semiconductors, group IV semiconductors, high index organic semiconductors, high index organic compounds, and mixtures or alloys thereof as described in column 3, lines 54-68 and column 4, lines 1-3.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the bonding material as taught by Gaudiana et al in the device of Duveneck et al in view of Spaeth et al in order to achieve high coupling efficiency and proper adhesion between the optical element and the light emitter.

Response to Arguments

13. Applicant's arguments with respect to claims 2-5, 7-13, 27-34, 41-47 and 50-52 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (703) 306-0533. On January 21, 2004, the telephone number will be changed to (571) 272-2306. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (703) 305-0024. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

ava
14 January 2004

MARK A. ROBINSON
PRIMARY EXAMINER